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ORIGINAL ARTICLE

Factor analysis of the ''Questionnaire for the evaluation of occupational burnout syndrome'' in Peruvian medical students☆,☆☆

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Professional burnout;
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Abstract
Background: The ''evaluation of occupational burnout syndrome questionnaire'' (''*Cuestionario para la evaluación del síndrome de quemarse por el trabajo* (CESQT)'') has been proposed to evaluate this syndrome in different populations. However, there have not been studies up to date that have tested this questionnaire in Latin-American university students.
Aim: To evaluate the dimensional structure of CESQT in medical students from Peru.
Methods: This was an observational, analytical and cross-sectional study. The CESQT was applied to a sample of 71 medical students in the final year of their degree (also known as ''Medical Internship'') in a Public Hospital in Lima, Peru. An exploratory factor analysis (EFA) was used to identify the dimension structure with best fit to the data. A multivariate linear regression analysis was also performed to determine the relationship between the occupational burnout syndrome, gender, and their current clinical rotation (obstetrics and gynaecology, surgery, paediatrics, and internal medicine).
Results: The EFA found that the two dimensions model best explained the data variability (61.8% of the variance). These two factors were called *illusion* and *exhaustion*. The linear regression showed that gender and the current clinical rotation were not associated to any of the two factors ($P > .05$). *Illusion* was inversely associated with *exhaustion*, even after fitting it with gender and current clinical rotation ($P = .007$and $\rho = -.33$, respectively).

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Conclusion: The information included in the CESQT is summed up in two highly correlated dimensions: *illusion* and *exhaustion* that are independent gender and the current clinical rotation in which the students were involved.
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PALABRAS CLAVE
Agotamiento profesional;
Interno;
Análisis factorial;
Perú

Análisis factorial del «Cuestionario para la evaluación del síndrome de quemarse por el trabajo» en estudiantes de medicina peruanos

Resumen
Introducción: El «Cuestionario para la evaluación del síndrome de quemarse por el trabajo» (CESQT) fue propuesto para evaluar este síndrome en diversas poblaciones, sin embargo, no ha sido utilizado en estudiantes universitarios en Latinoamérica.
Objetivo: Evaluar la estructura dimensional del CESQT en una población de estudiantes de medicina peruanos.
Material y métodos: Estudio observacional, analítico de corte transversal en una muestra de 71 estudiantes de medicina que cursaban el último año de la carrera (interno médico) en un hospital público en Lima, Perú. Se desarrolló un análisis factorial exploratorio para establecer la estructura de las dimensiones con mejor ajuste a los datos. Posteriormente, se realizó un análisis de regresión lineal múltiple para explorar la asociación entre síndrome de quemarse por el trabajo con el sexo y la rotación clínica en la que se encontraban (ginecología-obstetricia, cirugía, pediatría y medicina interna).
Resultados: El análisis factorial exploratorio encontró que el modelo con 2 dimensiones explicaba mejor la variabilidad de los datos (61,8% de la varianza). Estas 2 dimensiones se denominaron *desgaste* e *ilusión*. La regresión lineal mostró que el sexo y la rotación clínica actual no estuvieron asociados a ninguna de estas dimensiones ($p > 0{,}05$). La *ilusión* estuvo inversamente asociada al *desgaste*, inclusive después de ajustar por sexo y rotación clínica actual ($p = 0.007$; $\rho = -0{,}33$).
Conclusión: La información contenida en el CESQT se resume en 2 dimensiones altamente correlacionadas: *ilusión* y *desgaste*. Esta estructura es establecida independientemente del sexo y la rotación clínica que cursaban los alumnos.
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Introduction

Burnout syndrome (BS), a syndrome of work-related exhaustion and strain, is recognised as a response to occupational stress from which professionals from different fields, having direct contact with people, might find themselves suffering.[1] Different instruments have been used for measuring this, which has brought about several definitions for this condition.[1–3] Even though Freudenberger described BS symptomatology for the first time in 1973,[4] Maslach and Jackson (1981) were the ones to construct the first instrument for measuring it: the Maslach Burnout Inventory (MBI).[5] These authors also generated a new version (1986), in which BS was explained as a phenomenon characterised by 3 dimensions: low personal realisation in work (8 items), emotional exhaustion (9 items) and de-personalisation (5 items).[6] Finally, they proposed 3 versions for different populations (1996): the MBI-Human Services Survey (MBI-HSS) for healthcare professionals, the MBI-Educators (MBI-ES) for education professionals and the MBI-General Survey (MBI-GS) for people from other professions (apart from healthcare and education).[7]

Despite the fact that the MBI had obtained broad international acceptance, with evidence for its concurrent and divergent validity, as well as empirical support for the factorial structure, it has been found to show some deficiencies. This is especially evident when it is adapted to other languages, such as Spanish. These deficiencies include: little reliability in some of its dimensions, the fact that some items present factor loading greater than 0.4 in certain dimensions, the lack of a discriminant validity with related concepts such as depression and limited access to the MBI due to its commercial use.[8,9]

Other instruments have been created to measure BS, such as the Oldenburg Burnout Inventory (OLBI), developed by Demerouti et al. in Germany in 2001[10] and the Burnout Syndrome Evaluation Questionnaire (*CESQT* in Spanish), developed by Gil-Monte in Spain in 2006.[1] The latter has been used in several studies carried out in Spanish-speaking countries, such as Spain,[11] Argentina,[12] Mexico[13–15] and Chile.[16,17] It is important to mention that the CESQT differs from the MBI, as it has 4 dimensions: enthusiasm for work, psychological strain, indolence and guilt.[1]

Presently, there are no publications that have used the CESQT in Peru. However, studies have been carried out with Peruvian medical students using the MBI-HSS, where a 57.2% prevalence was found in students that studied internal medicine, which corresponded to the last year of medical studies, in which preprofessional practices are developed.[18] This stage lasts 12 months and consists of 4 rotations: paediatrics, surgery, internal medicine and obstetrics and gynaecology (OBGYN). The population that finishes this

training programme could potentially be at a greater risk for developing BS as they suffer from continuous academic stress while in permanent contact with other people.[19]

In addition, there is literature that supports the presence of this syndrome, called *academic burnout syndrome*, in university students, especially those in medicine and nursing programmes.[19] The prevalence of this syndrome oscillates between 1.9% and 55.3%, with the variation dependent on the populations studied and instruments used.[20–24] These findings suggest the possibility that this syndrome is developed pre-graduation in health science professionals.[19]

Given all the aforementioned information, we considered assessment of the presence of BS in Peruvian medical interns to be relevant. However, we did not find any literature with respect to instruments validated in Peruvian medical students, which impeded our ability to carry out direct measurements. Consequently, we needed to count on scales to reach this objective.

The present study was carried out with the objective of evaluating the properties and dimensional structure of the CESQT in a medical intern population as a part of the process to have locally validated instruments and to perform studies related to BS in Peru.

Materials and methods

Study design and population

We performed a transversal study of all the medical students (n = 88) that did their medical internship in a public hospital in Lima, during their last clinical rotation in December of 2010.

Measurements

Burnout syndrome evaluation questionnaire

The CESQT used was not modified in any way with respect to the original version.[24] As mentioned previously, the CESQT is composed of 20 items that assess 4 dimensions[1]:

- Enthusiasm for work (5 items): individual desire to reach occupational goals because they represent a source of personal achievement.
- Psychological strain (4 items): appearance of emotional and physical exhaustion due to having to treat people that present or cause problems on a daily basis at work.
- Indolence (6 items): appearance of negative attitudes, indifference and cynicism.
- Guilt (4 items): appearance of feelings of guilt for the behaviour and negative attitudes developed at work, especially towards people with whom professional relationships have been established.

The items explore the frequency with which the person surveyed presents different situations, using a Likert scale, where 1 is never, 2 is a few times per year, 3 is a few times per month, 4 is a few times per week and 5 is everyday.

On the CESQT, BS is defined as a low score in enthusiasm for work and high scores on psychological strain and indolence. After acknowledging this, whether the individual presents a high score in the guilt dimension is also determined.

Other variables

Sex (male or female) and clinical rotation (surgery, OBGYN, internal medicine or paediatrics) were also measured at the time of the interview.

Procedures

A list of names for each of the medical interns was generated. A database was then created where the participants' names were replaced by codes, which were also used in the questionnaires.

Later, the students were categorised by the department of their corresponding clinical rotation. Participation in the study was voluntary. The questionnaires were self-administered, and participants were informed of the study objectives and were oriented on the correct completion of the questionnaires beforehand. The average completion time was 15 min.

Three researchers were trained to resolve the doubts raised while the questionnaire was being completed. Quality control was performed afterwards, during the digitisation of the data.

Ethical aspects

The study was evaluated and approved by the Research and Ethics Committee at the level III public hospital where the study was performed. Participation was voluntary through verbal consent after the objectives of the study were explained. The questionnaire was anonymous, confidential and provided an informative cover page.

Statistical analysis

Descriptive level

At the descriptive level, absolute and relative frequencies were reported for the categorical variables. Means and standard deviation were calculated for the numeric variables.

Exploratory factor analysis

An exploratory factor analysis (EFA) was performed to establish the dimensional structure present in the CESQT data obtained from the sample. Principal component analysis was used, as well as orthogonal rotation, in order to derive uncorrelated dimensions.

With respect to the number of dimensions, several models were evaluated (from 2 to 6 dimensions), including components with eigenvalues greater than 1. The component that described the different patterns of BS with greater parsimony was selected, according to the researchers' judgements and theoretical aspects of BS.

After selecting the best factorial model, internal consistency was measured for each of the resulting dimensions using Cronbach's alpha.

Linear regression

Finally, the association between each of the dimensions and the sex and clinical rotation variables was evaluated using simple and multiple linear regression models. The objective was to explore whether any of these BS dimensions varied with respect to sex and clinical rotation.

Results

Of the total 88 students who did their internship, 3 did not accept participation and 3 were not found during the questionnaire administration time. Consequently, 82 students were surveyed, but only 71 participants were included in the analysis, as 11 did not complete the questionnaires correctly.

Of all the students surveyed, a little more than half were male. In addition, 22 were on surgical rotation, 22 on internal medicine, 15 on paediatrics and 12 on OBGYN.

A correlation analysis was performed between the 20 items on the scale. As observed in Table 1, there are some that were directly related on a consistent basis, while others were inversely related. Pearson's correlation coefficient was found to be between 0.014 and 0.645 for the direct correlations, while it was between −0.004 and −0.364 for the inverse correlations.

The EFA is presented in Table 2, in which the model with 2 dimensions was found to explain 61.8% of variability in the data. This model grouped the items parsimoniously and with theoretical significance. These dimensions were called *professional strain* and *enthusiasm for work*. The first dimension included 3 of the domains identified in the original version of the CESQT: *indolence*, *guilt* and *professional strain*.

The *strain* dimension consisted of items 2, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 16, 17, 18 and 20. The values obtained varied from 5 to 38, with a mean of 21.59, standard deviation (SD) of 8.0 and a median of 21. The 75th percentile showed a cut-off point of 27 on the scale, which would be the people with greater symptomatology of *strain* from work.

The *enthusiasm* dimension consisted of questions 1, 5, 10, 15 and 19. The values obtained varied from 9 to 20, with a mean of 15.8, SD of 3 and median of 16. The 25th percentile showed a cut-off point of 14 on the scale, and consisted of 14 people.

For the *strain* dimension, Cronbach's alpha was 0.85. After considering the alpha without 1 of the items, reliability varied between 0.83 and 0.86. With respect to the *enthusiasm* dimension, Cronbach's alpha was 0.8, and reliability varied between 0.73 and 0.8 after considering the alpha without 1 of the items. In general, all these results suggest that the questions have a good level of reliability in each of the dimensions.

In addition, we found that the *strain* dimension was inversely correlated with the *enthusiasm* dimension. However, this correlation is weak ($P = -.33$). For greater exploration of the association between these 2 dimensions, a simple and multiple linear regression analysis was performed to consider the potential effect that sex and clinical rotation had on this association. We found that *enthusiasm* had a significant inverse association with the *strain* dimension.

Table 1 Correlation between items.

	Q. 1	Q. 2	Q. 3	Q. 4	Q. 5	Q. 6	Q. 7	Q. 8	Q. 9	Q. 10	Q. 11	Q. 12	Q. 13	Q. 14	Q. 15	Q. 16	Q. 17	Q. 18	Q. 19	Q. 20
Q. 1	1.0000																			
Q. 2	−0.2402	1.0000																		
Q. 3	−0.3047	0.4667	1.0000																	
Q. 4	−0.2753	0.0458	0.1326	1.0000																
Q. 5	0.4423	−0.0708	−0.1482	−0.0745	1.0000															
Q. 6	−0.0324	0.0752	0.3424	0.1046	−0.0331	1.0000														
Q. 7	−0.2806	0.4944	0.4697	0.1603	−0.0042	0.4025	1.0000													
Q. 8	−0.1179	0.2436	0.2633	−0.0261	−0.1367	0.3042	0.3465	1.0000												
Q. 9	−0.0816	0.0853	0.1866	0.4017	−0.0151	0.2568	0.3001	0.2311	1.0000											
Q. 10	0.5269	−0.2278	−0.2631	−0.2157	0.4803	0.0157	−0.0686	−0.2035	−0.2728	1.0000										
Q. 11	−0.2166	0.2204	0.487	0.019	−0.0439	0.4567	0.4788	0.2533	0.3016	−0.1625	1.0000									
Q. 12	−0.2018	0.1626	0.1465	0.1763	−0.0879	−0.0954	0.1279	0.6036	0.3462	−0.1773	0.2274	1.0000								
Q. 13	−0.2196	0.3355	0.2925	0.1795	−0.2166	0.2161	0.5058	0.4239	0.4298	−0.2363	0.469	0.375	1.0000							
Q. 14	−0.1835	0.0974	0.3421	0.2413	0.1957	0.3923	0.4878	0.1302	0.1431	−0.0616	0.5434	0.0142	0.3078	1.0000						
Q. 15	0.4802	−0.223	−0.1965	−0.109	0.4585	−0.2394	−0.2604	−0.2743	−0.151	0.5823	−0.1397	−0.1873	−0.3537	−0.1131	1.0000					
Q. 16	−0.1173	−0.0275	0.1731	0.3398	0.0492	0.2105	0.1248	0.0571	0.3565	−0.1255	0.3149	0.2234	0.3417	0.0955	−0.182	1.0000				
Q. 17	−0.1734	0.3459	0.2873	0.1751	0.0509	0.1743	0.4066	0.6456	0.1981	0.0414	0.2594	0.5208	0.3994	0.2417	−0.107	0.2777	1.0000			
Q. 18	−0.3641	0.312	0.3244	0.1258	−0.1844	0.1158	0.3929	0.5639	0.1721	−0.1772	0.3953	0.5143	0.4459	0.2812	−0.256	0.1797	0.613	1.0000		
Q. 19	0.3472	−0.0084	−0.0285	−0.1388	0.3173	−0.0788	−0.0338	−0.2537	−0.2567	0.3526	−0.0546	−0.171	−0.1433	0.038	0.4983	−0.0273	−0.1641	−0.3476	1.0000	
Q. 20	−0.1502	0.0674	0.2663	0.4502	0.0646	0.2677	0.268	0.1544	0.3871	−0.0675	0.333	0.303	0.3767	0.3144	−0.0389	0.6251	0.3027	0.3438	−0.0797	1.0000

Q.: question.

Table 2 Matrix of factorial patterns and variances.

Item	1	2	Variance	Alpha without item
1. Work challenge	−0.205	0.627	0.565	0.758
2. No cooperation	0.368	−0.240	0.808	0.847
3. Intolerable patients	0.528	−0.193	0.684	0.839
4. Worry about treating people	0.312	−0.152	0.880	0.856
5. Personal achievement	0.093	0.665	0.549	0.769
6. Burden	0.502	0.039	0.746	0.846
7. Indifferent	0.681	−0.099	0.527	0.834
8. Saturated	0.526	−0.328	0.616	0.837
9. Guilty	0.472	−0.172	0.748	0.842
10. Positive things	−0.069	0.744	0.443	0.741
11. Irony	0.679	−0.051	0.537	0.835
12. Overwhelmed	0.437	−0.311	0.713	0.842
13. Remorse	0.626	−0.290	0.524	0.834
14. Labelling	0.588	0.112	0.642	0.843
15. Gratifying work	−0.165	0.733	0.436	0.726
16. Asking forgiveness	0.475	−0.020	0.774	0.843
17. Physical tiredness	0.647	−0.115	0.568	0.831
18. Emotional tiredness	0.581	−0.363	0.531	0.832
19. Enthusiasm	−0.069	0.576	0.663	0.797
20. Things said poorly	0.616	0.022	0.620	0.838

This association was maintained even after adjusting for the 2 variables mentioned ($P = .007$). Furthermore, the linear regression model showed that neither the sex nor present clinical rotation variables were associated with *strain* or *enthusiasm* (Table 3).

Discussion

The principal findings in our study showed that the 2-dimensional model was best adjusted to our sample (*enthusiasm for work* and *professional strain*). This structure was established independently of sex and present clinical rotation. Likewise, the entire questionnaire, as well as each dimension, showed Cronbach's alpha to be higher than 0.7; this indicates that the instrument presents adequate internal consistency.

This finding has important implications, as it contributes to the factorial validity of this questionnaire and suggests that its functioning in populations of Peruvian medical students in their last year of study could be different from that shown in other countries where it has been validated previously. Specifically, our study showed that CESQT behaviour in Peruvian medical students had 2 dimensions, while in other populations, such as in Spain,[1,11] Argentina,[12] Mexico[13–15] and Chile,[16,17] the questionnaire showed 4.

Table 3 Factors associated with each of the components.

	β	95% CI	P
Strain			
Enthusiasm	−0.87	−1.495 to −0.248	0.007
Sex	1.28	−2.376 to 4.929	0.488
Present rotation	−0.18	−1.835 to 1.473	0.828
Enthusiasm			
Strain	−0.12	−0.205 to −0.034	0.007
Sex	0.29	−1.068 to 1.643	0.673
Present rotation	0.34	−0.269 to 0.945	0.270

Results obtained from multivariate analysis.

In the EFA of the CESQT prepared by Gil-Monte, the 4-dimensional model was found to explain 60.9% total variance (factor loading was considered to be greater than 0.35 for it to pertain to each factor). In relation to our study, the 2-dimensional model was the one that best adjusted to the data obtained (a factor loading greater than 0.4 was used for the item to pertain to each factor); this model explained 61.8% of the variance, which is slightly better than the variance explained by the previously mentioned 4-dimensional model.[11]

In the initial validation, Gil-Monte found that internal consistency (measured using Cronbach's alpha) ranged between 0.79 and 0.86 on the 4 dimensions, with the *indolence* dimension being the lowest. This aspect was different from that found in our study, where *enthusiasm* was found to have the lowest Cronbach's alpha (0.79). This could be because the *strain* dimension in our study included the questions corresponding to the 3 dimensions in CESQT found in previous studies (*indolence, guilt and psychological strain*). Meanwhile, the *enthusiasm* dimension in our study contained the same questions as its corresponding dimension in the 4-dimensional structure.[1]

It is relevant to consider the socio-cultural differences of the sample used in the 2 studies, as this might explain the differences found in the analysis. The Gil-Monte study used a sample of 201 nursing professionals, who had a mean of 17 years of work experience,[1] while our study

used a sample of participants in their first year of hospital intern work. This could explain the differences regarding performance of the questionnaire when considering the 2-dimensional model, which, in our study, better explains the data found.

It is important to mention that this has been the first opportunity, in Peru, to explore BS with medical interns by using the CESQT. In addition, the questionnaire was applied at a strategic moment of the internship, as it was administered in the final days. This allowed for better performance from the student, given that the probabilities of having BS are associated with greater time of exposure.[19]

However, there are some limitations in the present study. The entire sample came from only 1 hospital institution selected based on convenience, and there was a high rate of non-participation (around 40%). Both of these aspects reduce the possibility of generalising the results to other professional healthcare fields in Peru. In this sense, future studies that include greater variability of participants are needed, making it possible to obtain a valid instrument that helps in the study of burnout syndrome among the population of healthcare professionals in the country. Our findings represent information that could be taken into account for the design and implementation of these future studies.

In conclusion, the information contained in the CESQT is summarised in 2 highly correlated dimensions (*enthusiasm* and *strain*), which are independent of sex and the clinical rotation performed by the medical students doing their medical internship.

Ethical disclosures

Human and animal protection.

The authors declare that no experiments were performed with humans or animals for this study.

Data confidentiality. The authors declare that no participant data appear in this study.

Right to privacy and informed consent. The authors declare that no participant data appear in this study.

Conflicts of interest

The authors have no conflicts of interest to declare.

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